

VOCABULARY

evidencehypothesistechnology

2.1 The Scientist's Mind

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Scientists come from many different backgrounds, but in their work they use many common tools, techniques, and habits of mind.

The qualities of scientific thinking include asking questions, seeking evidence, forming hypotheses, testing hypotheses, being skeptical, and working cooperatively.

Technology plays an important role in applying scientific discoveries to everyday life.

* On the left page of your notebook describe a time when you used scientific thinking. p14

Draw a line to match the term to the definition

evidence

hypothesis

technology

The application of scientific discoveries to meet human objectives.

The material or data from which conclusions can be drawn and by which proof can be established.

A tentative explanation for an observation or phenomenon, developed from available information and used as a basis for testing.

2.2 Scientific Methods of Inquiry

Doing science is a complex process that does not proceed neatly from one revelation to the next.

When scientists investigate questions, they state the question, gather evidence, form a hypothesis, and test the hypothesis.

Scientists publish their results in scientific journals, which provides the opportunity for their peers to review their work. Testing ideas is vital to science. This is called peer review.

Information gathered through scientific inquiry contribute to scientific theories and laws.

Scientific laws are generalizations about the natural world and how it behaves.

In everyday use, theory means a guess or a hunch, something that maybe needs proof. *In science, a theory is not a guess, not a hunch. It's a well-substantiated, well-supported, well-documented explanation for our observations.*

3 key parts of a theory

A theory ties together all the facts about something, providing an explanation that fits all the observations and can be used to make predictions. In science, theory is the ultimate goal, the explanation. It's as close to proven as anything in science can be.

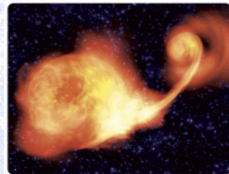
CHAPTER

2

The Nature of Science

A theory is an explanation for observable events for which no exceptions have been noted.

Developing a Theory About the Formation of the Moon



Fission This hypothesis proposed that the moon had once been part of Earth. Earth was spinning so fast that a large piece tore away and flew off into space.

Fission was disproved.



Impact This hypothesis proposed that during Earth's formation, a planet-sized object struck it. The impact destroyed the other planet and released debris, which eventually coalesced into the moon.

This theory is currently accepted.

One way to tell a law and a theory apart is to ask if the description gives you a means to explain 'why'.

Example: Consider **Newton's Law of Gravity**. Newton could use this law to predict the behavior of a dropped object, but he couldn't explain why it happened.

Examples of other laws

- **Boyle's Gas Law** which states that at constant temperature the volume of a gas varies inversely with its pressure.
- **Mendel's law of independent assortment**, which states that the genes controlling different traits are distributed separately from each other during meiosis

Examples of scientific theories

- **The Big Bang Theory** which gives an explanation for how the universe formed
- **Einstein's Theory of Relativity** ($E=mc^2$) which gives an explanation for how nuclear reactions give off so much energy

On the left page of your notebook make a T chart to compare scientific laws and scientific theories

Let's
p. 2-3

Laws	Theories
Use observation Say what will happen.	Use observations Explain 'why'

Draw a line to match the term to the definition	
law	Investigation of a natural phenomenon by observing, asking questions, forming a hypothesis, gathering data, testing the hypothesis, and sharing what has been learned.
peer review	The process by which one's work or research is reviewed by experts in the field to evaluate the validity of the work.
scientific inquiry	An explanation or model based on observation, reasoning, and experimentation, especially one that has been tested and confirmed as a general explanation for phenomena that has been observed.
theory	A generalized statement about how the natural world behaves under certain conditions and for which no exceptions have ever been found.

